PROSTATE CANCER SUMMARY

INTRODUCTION

More than 3,300 Wisconsin residents were diagnosed with prostate cancer and 750 residents died from prostate cancer in 1998. Prostate cancer is the most commonly diagnosed new cancer among men, and is second only to lung cancer as the leading cause of male cancer deaths in Wisconsin and nationally. This paper summarizes information about prostate cancer incidence, mortality, risk factors, detection and current research. Further reading of referenced materials and discussion of individual questions with medical experts are encouraged.

WHO GETS PROSTATE CANCER?

General Incidence

In 1998 (the most recently published information), prostate cancer accounted for 28 percent of all new cancer cases among Wisconsin males. During that same year, there were 3,348 new cases of invasive prostate cancer reported to the Wisconsin Cancer Reporting System (WCRS) (1).[A] Eighty percent of these cases were diagnosed at the early or local stage, 10 percent were diagnosed at the regional stage, 6 percent were diagnosed at the distant stage, and 4 percent were reported as unknown in stage. (See page 10 for stage of disease definitions.)

The 1998 Wisconsin age-adjusted incidence rate for prostate cancer was 122 per 100,000 male population.[B] The most recent comparable national figure for prostate cancer is the 1997 incidence rate of 139 per 100,000 (2). However, five-year (1993-1997) combined incidence rates are more similar, at 144 per 100,000 in Wisconsin and 147 per 100,000 in the U.S. (2,3).

[A] Source document number shown in parentheses corresponds to list in References section.

[B] Incidence and mortality rates are per 100,000 male Wisconsin residents, age-adjusted to the 1970 population. To calculate age-adjusted rates, age-specific rates are first determined, then weighted by multiplying each age-specific rate by the proportion of the 1970 U.S. standard population in that age group. The age-adjusted rate is the sum of the weighted age-specific rates.

Incidence by Age and Race

Age. A sharp increase in incidence with advancing age is the hallmark of prostate cancer. Reflecting the general trend in the population towards increased longevity, the number of men afflicted with prostate cancer is rapidly increasing; 98 percent of prostate cancers in Wisconsin occur among those 50 years of age and older (1). The American Cancer Society publishes national estimates for the probability of developing prostate cancer. At age 39 the probability is relatively low, approximately 1 in 10,000. The probability increases dramatically to 1 in 53 for men aged 40 to 59 and to 1 in 7 for men aged 60 to 79 (4).

Race. In Wisconsin for the combined years 1993-1997, African-American men had a considerably higher prostate cancer incidence rate than white men.[C] The incidence rate was 66 percent higher for African-American men than for white men, or 232 per 100,000 compared with 140 per 100,000, respectively. (3) According to the National Cancer Institute, national prostate cancer incidence rates showed a similar disparity for years 1993-1997 between African-Americans (238 per 100,000) and whites (141 per 100,000) (2).

WHAT ARE THE MORTALITY AND SURVIVAL FIGURES FOR PROSTATE CANCER?

General Mortality

Prostate cancer causes 13 percent of male cancer deaths in Wisconsin, second only to lung cancer, as shown in Table 1.

Table 1. Leading Cancer Deaths, Wisconsin Males, 1998

Site	(% of total)
Lung	**29%**
Prostate	**13%**
Colorectal	**10%**

Source: Wisconsin Cancer Reporting System, Bureau of Health Information, Division of Health Care Financing, Department of Health and Family Services.

The 1998 age-adjusted Wisconsin mortality rate for prostate cancer was 24 per 100,000 male population.[D] The most recent published national rate for prostate cancer mortality (1997) was 23 per 100,000 (2). The five-year (1993-1997) combined mortality rates are similar, at 26 per 100,0000 in Wisconsin and 25 per 100,000 in the U.S. (3).

[C] Due to limitations in population counts for races other than white and African-American, the North American Association of Central Cancer Registries does not publish age-specific rates for other racial/ethnic groups for Wisconsin.

[D] Incidence and mortality rates are per 100,000 male Wisconsin residents, age-adjusted to the 1970 population. To calculate age-adjusted rates, age-specific rates are first determined, then weighted by multiplying each age-specific rate by the proportion of the 1970 U.S. standard population in that age group. The age-adjusted rate is the sum of the weighted age-specific rates.

Mortality by Age and Race

Age. Reflecting higher prostate cancer incidence with age, 100 percent of Wisconsin prostate cancer deaths in 1998 occurred among men aged 50 or older. Prostate cancer deaths increase dramatically after age 50 and peak after age 85; almost one-third (29 percent) of deaths are found in this oldest age group (1). The American Cancer Society reports similar figures for the nation, and estimates more than 75 percent of prostate cancers are diagnosed in men over age 65 (4).

Race. In Wisconsin for the years 1993-1997, prostate cancer mortality rates were twice as high among African-American men (54 per 100,000) as among white men (23 per 100,000)[E] (3). Data from the National Cancer Institute show that African-American men nationally also have a two-fold higher mortality (54 per 100,000) than white men (23 per 100,000) (2).

Survival by Stage at Diagnosis

In Wisconsin, 80 percent of prostate cancers diagnosed in 1998 were detected at the local stage, 10 percent at the regional stage, and 6 percent at the distant stage of disease (four percent of cases were not staged) (1). These proportions have been relatively similar each year since 1990. For the years 1989-96, according to the National Cancer Institute, 80 percent of prostate cancers nationally were diagnosed at the local or regional stage and 8 percent at the distant stage (12 percent of cases were not staged) (2).

The national five-year survival rate for all prostate cancer patients is 93 percent. When prostate cancer is detected before it has spread beyond the prostate, the five-year survival rate is 100 percent. If the cancer has spread to tissue near the prostate, the five-year survival rate is 94 percent. If prostate cancer has spread to distant parts of the body, the five-year survival rate is about 33 percent (2).

HOW HAVE INCIDENCE AND MORTALITY CHANGED OVER TIME?

In Wisconsin and nationally since 1992, prostate cancer incidence and mortality have both declined. The sharp increase in incidence during the late 1980s and subsequent decline since 1992 is attributed to the rise of Prostate-Specific Antigen (PSA) testing, approved by the Food and Drug Administration (FDA) in 1986. The increased testing detected prostate cancers that previously were inactive and undetected, and resulted in an "artifactual" rise in incidence. The increased incidence of prostate cancer is largely attributed to increased detection rather than an increase in the actual number of prostate cancers (5,6,7). Physicians increasingly used the PSA test for men age 65 and older; PSA testing increased from 1,430 tests per 100,000 men in 1988 to 18,000 tests per 100,000 men in 1991 (8).

[E] Due to limitations in population counts for races other than white and African-American, the North American Association of Central Cancer Registries does not publish age-specific rates for other racial/ethnic groups in Wisconsin.

Incidence trends. Prostate cancer incidence in Wisconsin increased by approximately 120 percent from 1986 to 1992, from 79 to 173 per 100,000 population (1).[F] During that same period, 1986 to 1992, national incidence increased by 109 percent, from 91 to 190 per 100,000 population (2). The national incidence of this disease peaked in 1992, then declined each year from 1993 to 1995, and since 1995 has remained relatively stable at about 139 per 100,000 population. Wisconsin prostate cancer incidence paralleled the national pattern, with a peak incidence in 1992 and sharp decreases every year until 1995, when the rate stabilized at approximately 135 per 100,000 through 1996. (However, data from the most recent two years show that Wisconsin rates increased slightly in 1997 to 142 per 100,000 and decreased dramatically in 1998 to 122 per 100,000.) The recent decline in prostate cancer incidence is attributed to a general decline in the number of men at higher risk who have never been tested, and to more restraint by health care providers in recommending PSA testing.

Mortality trends. Parallel to incidence rates, prostate cancer mortality rates in Wisconsin peaked in 1993 at 29 per 100,000, and declined subsequently to the 1998 rate of 24 per 100,000. (1) National prostate mortality rates peaked at 27 per 100,000 in 1991 and thereafter declined to the 1997 rate of 22 per 100,000.

Trends in stage at diagnosis and survival. Since 1992 there has been a shift towards diagnosis at an earlier stage of disease. In 1992, 68 percent of prostate cancer cases were diagnosed at an early or local stage, 15 percent at the regional stage, and 8 percent at the distant stage. In 1998, over three-fourths (80 percent) of prostate cancer cases in Wisconsin were diagnosed at the local stage; 10 percent were diagnosed at the regional stage and 6 percent were diagnosed at the distant stage (4 percent were not staged) (1).

According to the most recently available national data from the National Cancer Institute (for years 1989-1996), five-year survival rates are 100 percent for prostate cancer cases diagnosed at the local or regional stage and 33 percent for prostate cancer diagnosed at the distant stage (2).

WHAT ARE THE RISK FACTORS FOR PROSTATE CANCER?

The American Cancer Society defines a risk as anything that increases a person's chance of developing cancer. This means there is a greater chance of developing cancer for a person with the risk factor than for a person without the risk factor, but it does not predict with certainty those who will develop the disease.

The causes of prostate cancer are not clearly understood, but the factors listed below are consistently associated with increased risk by the American Cancer Society and the National Cancer Institute (9,10,11).

[F] Incidence and mortality rates are per 100,000 male Wisconsin residents, age-adjusted to the 1970 population. To calculate age-adjusted rates, age-specific rates are first determined, then weighted by multiplying each age-specific rate by the proportion of the 1970 U.S. standard population in that age group. The age-adjusted rate is the sum of the weighted age-specific rates.

Age. The single most important risk factor for developing prostate cancer is age, and the chances for developing the disease increase dramatically after age 50. Over 80 percent of all prostate cancers are diagnosed in men over age 65 (12).

Race. The incidence and mortality rates for African-American men are higher than the rates for white men. The relationship between race and prostate cancer has been the focus of research efforts. Some studies have suggested that African-American men may have more biologically aggressive prostate cancer than other racial groups, and have higher PSA levels at time of diagnosis (13,14). Other researchers have examined the differences in access to health care as a reason for more advanced stage of disease at the time of diagnosis (15,16).

Family history of prostate cancer. Prostate cancer seems to run in certain families. There is an overall two-fold to three-fold increase in prostate cancer for men whose close family members have prostate cancer. Younger age at diagnosis and the number of family members affected are important familial factors (9).

High-fat diet. Most studies indicate that diets high in fat increase the risk for prostate cancer. A diet high in fat may double the risk for developing prostate cancer (9). A study sponsored by the National Cancer Institute found an increased risk of prostate cancer attributable to diets high in fat for all ethnic (African-American, Asian and white) groups studied (17).

Nationality. Prostate cancer is most common in North America and northwestern Europe, and less common in Asia, Africa, Central America and South America. International rates vary more than 65-fold for low-incidence to high-incidence populations (18). Some of this variation is attributed to differences in prostate screening and detection across countries. Certain migrant studies have found a shift to higher incidence in men who move from lower risk to higher risk countries that implicate environmental or dietary contributing factors.

Studies have suggested other factors that may play a role in prostate cancer, but the results are inconclusive or inconsistent. Further research is underway for the following as possible contributing factors:

Vasectomies, particularly in men under 35,

Diets high in calcium or milk products,

History of benign prostatic hyperplasia,

Androgenic male hormones, or higher levels of testosterone,

Obesity and sedentary lifestyle, and

Occupations (with exposure to cadmium, herbicides and fertilizers).

HOW CAN PROSTATE CANCER BE PREVENTED OR CONTROLLED?

Current knowledge of prostate cancer risk factors is not sufficient to recommend strategies for primary prevention through lifestyle changes. Many known risk factors such as age, race, and family history are not modifiable. However, diet is one modifiable risk factor for which all national cancer organizations have issued guidelines to help reduce the risk of prostate cancer.

Prevention – Lifestyle Choices

Low-fat diet. Research results strongly suggest that high fat intake leads to increased risk of prostate cancer. The National Cancer Institute and American Cancer Society recommend a diet low in fat from animal sources and high in fruits and vegetables, as a possible preventive measure. Studies have found higher fat consumption to be associated with higher prostate cancer incidence as well as lower survival among prostate cancer patients (19,20).

Fruits and vegetables. Dietary recommendations for the prevention of all types of cancer have emphasized the value of consuming a variety of fruits and vegetables. The National Research Council, the American Cancer Society, the National Academy of Sciences and the National Cancer Institute have made recommendations for the dietary prevention of cancer and have found a clear preventive benefit from high consumption of fruits and vegetables (21,22). The strongest preventive effect is from cruciferous vegetables such as broccoli, cabbage, cauliflower, and Brussels sprouts (23). Dietary consumption of lycopene, found in tomatoes and tomato products, has also been associated with lower risk of prostate cancer (24).

Vitamin supplements. The value of vitamin supplements in preventing prostate cancer is far from clear, but a recent major study found Vitamin E beneficial. Finnish smokers who took 50 milligrams of Vitamin E daily lowered prostate cancer incidence by 32 percent and mortality by 41 percent (25). Taking Vitamin A supplements was found to increase or have no effect on prostate cancer incidence, and therefore is not generally recommended (25,26).

Hormone suppression. There is evidence that prostate cancer development is linked to increased levels of male hormones (androgens). The NCI-sponsored, seven-year Prostate Cancer Prevention Trial is currently underway to determine if androgen-lowering medications can reduce the risk in 18,000 men (27).

Screening Guidelines from National Cancer Organizations

Screening is the use of medical tests to detect disease in people without known symptoms of that disease. At this time, no organization supports the routine screening for prostate cancer of all asymptomatic men in the general population. However, organizations are divided on the issue of screening men over age 50 for two reasons (28). First, prostate cancer, unlike most other cancers, may grow slowly, and many men die of other causes before the symptoms of the disease are manifested. Health professionals sometimes fail to predict which prostate cancers will become clinically aggressive and which will be inactive and harmless. The adverse effects of treatment, such as incontinence and impotence, may negatively alter the quality of life without prolonging survival. Prostate cancer screening contributes to early detection and more aggressive treatment of indolent prostate cancer. Second, the most widely used screening test is not definitive or conclusive and can lead to false positive and false negative results that are unreliable for mass screening. Therefore, all national cancer organizations stress the need for informed decision-making between an individual patient and medical professionals.

Methods of Detecting and Diagnosing Prostate Cancer

The most common methods of detecting prostate cancer are the Prostate-Specific Antigen (PSA) blood test and digital rectal examination (DRE) of the prostate gland. Most known primary risk factors for prostate cancer are not preventable (age, race, and family medical history), so screening is proposed as the best means of reducing the risk of dying from prostate cancer.

Prostate-specific antigen (PSA) test. Prostate- specific antigen (PSA) is produced by the prostate gland and measured by a blood test. Elevated PSA levels in the blood are considered a "marker" for prostate abnormalities, including prostate cancer, benign prostate growths and prostate infections. PSA levels are reported as nanograms per milliliter, or ng/ml. Levels under 4 ng/ml are considered normal, levels from 4 to 10 are considered borderline, and levels over 10 are usually considered high and possibly indicative of cancer. Generally the higher the PSA level the more likely the presence of cancer (29). However, this test alone does not provide a definitive diagnosis and a biopsy is required for confirmation of cancer.

Digital rectal exam (DRE). A physician inserts a gloved finger into the rectum to feel for any irregular or abnormally firm area that may be cancer. Many prostate cancers begin in the posterior part of the gland that can be reached by a digital rectal examination. If a DRE is abnormal, further tests will be conducted to determine if the abnormality is cancer.

Transrectal ultrasound (TRUS). Transrectal ultrasound uses sound waves released from a small probe placed in the rectum to create an image of the prostate on a screen. TRUS plays an important role in conducting biopsies and staging prostate cancer. Prostate tumors often reflect sound waves differently from normal tissue. TRUS can also be used to guide the biopsy needle into abnormal areas of the prostate following results of other screening cancer tests that show abnormal findings.

Medical biopsies. Biopsies are conducted to examine a tissue sample from a mass in the prostate under the microscope to see if cancer cells are present. A biopsy is necessary for the doctor to confirm a cancer diagnosis, and to identify the specific type of prostate cancer and its stage.

Screening Recommendations

Controversy exists about prostate cancer screening because of the complexity and variability of the disease, the slow-growing nature of many prostate cancers, and the limited accuracy of the screening tests. There is no consensus about recommendations for screening from national cancer organizations. The lack of consensus arises from the inability to assess the benefits of screening adequately in relation to the significant risks associated with treatment. Following is a list of the screening recommendations from major national cancer organizations (30, 31, 32).

- The U.S. Preventive Task Force, the Centers for Disease Control and Prevention, and the Agency for Health Care Research and Quality have not endorsed or recommended routine screening for prostate cancer.

- The American Cancer Society and the American Urological Association recommend that health care providers offer PSA annually to men 50 years of age and older who have at least a 10-year life expectancy. Guidelines also include recommendations for screening men at higher risk (African-Americans and men with two or more first-degree relatives with prostate cancer) beginning at age 45. The American Cancer Society recommends that men be informed about prostate cancer screening including what is known and not known about the benefits and risks of screening.

- The American College of Physicians (ACP) states, "Rather than screening all men for prostate cancer as a matter of routine, physicians should describe the potential benefits and known harms of screening, diagnosis, and treatment; listen to the patient's concerns; and then individualize the decision to screen." The ACP also recommends that physicians help enroll men in clinical studies.

The Canadian Task Force on Preventive Health Care does not recommend the screening of asymptomatic men of any age for prostate cancer (33). The government of the United Kingdom is investigating potential benefits, but does not currently support this screening (34).

WHERE TO FIND MORE INFORMATION

Web sites for general cancer topics, including prostate cancer

National Cancer Institute Cancer Information Service Telephone: 1-800-4-CANCER

National Cancer Institute Cancer Net Website: http://www.cancer.gov/cancer_information

American Cancer Society Telephone: 1-800-ACS-2345
Website: http://www.cancer.org

Centers for Disease Control and Prevention
National Center for Chronic Disease and Health Promotion
http://www.cdc.gov/cancer

Cancer News on the Net
http://www.cancernews.com

Harvard Center for Cancer Prevention
http://www.hsph.harvard.edu/cancer

Mayo Clinic Cancer Information (click on “Diseases and Conditions A-Z”)
http://www.mayoclinic.com/

Johns Hopkins Comprehensive Cancer Center
http://www.hopkinskimmelcancercenter.org

University of Pennsylvania Cancer Center- Oncolink
http://cancer.med.upenn.edu/

Wisconsin Cancer Reporting System
http://www.dhfs.state.wi.us/wcrs/index.htm

University of Wisconsin Comprehensive Cancer Center
http://www.cancer.wisc.edu

MEDLINE - National Library of Medicine- Cancer
http://www.nlm.nih.gov/medlineplus/cancers.html

Web sites for prostate cancer

National Prostate Cancer Coalition
http://www.4npcc.org

American Foundation for Urologic Disease
http://www.afud.org

The Association for the Cure of Cancer of the Prostate
http://www.capcure.org

University of Wisconsin Comprehensive Cancer Center
http://www.cancer.wisc.edu

Prostate Cancer Research Institute
http://www.prostate-cancer.org

Prostate Cancer Institute
http://www.prostatecancernj.com/

DEFINITIONS

Prostate -A male sex gland, about the size of a walnut, that produces fluid that forms part of the semen. It is located below the bladder and in front of the rectum.

Prostate-Specific Antigen (PSA) - A protein produced by the prostate gland that circulates in the blood. By checking the PSA levels in the blood, in combination with other tests, physicians can identify patients who need further tests and biopsies. PSA levels often rise when prostate abnormalities are present.

Digital Rectal Exam (DRE) - During a DRE, a physician inserts a gloved lubricated finger into the rectum to feel for any irregular or abnormally firm area that may be cancer.

Cancer – A group of diseases characterized by uncontrolled growth and spread of abnormal cells. If the spread is not controlled, it can result in death.

Cause - Cancer is caused by both external factors (chemicals, radiation, and viruses) and internal factors (hormones, immune conditions, and inherited mutations). Causal factors may act together or in sequence to initiate or promote cancer. Ten or more years may pass between exposures and detectable cancer.

Risk factor – Something that increases a person's chance of developing a disease. Having a risk factor means a person has a greater chance of developing a disease than a person without the risk factor, but it does not predict with any certainty those who will develop a disease.

Cancer screening – Checking for changes in tissues, cells or fluids that may indicate the possibility of cancer when there are no symptoms. Regular screening exams can result in the detection of cancers at earlier stages, when treatment is more likely to be successful.

Cancer diagnosis – The detection of cancer based on screening and diagnostic tests that confirm the presence of cancer cells. Primary diagnoses are based on the cancer site of origin. For example, a cancer originating in prostate tissue is diagnosed as prostate cancer, even if it has spread to other parts of the body. (Cancers that spread to the prostate from other sites are therefore not considered primary prostate cancers.) This report presents information about primary prostate cancers.

Stage of disease at diagnosis – The stage of disease at diagnosis refers to the extent of the spread of disease at the time of diagnosis. The staging classification used in this report is the National Cancer Institute's Summary Staging Guide for Cancer: Surveillance Epidemiology and End Results Reporting. The summary stages are defined as follows:

> Local – A malignant tumor that is confined to the organ of origin with no evidence of spreading to other parts of the body.
>
> Regional – A malignant tumor that has spread beyond the limits of the organ of origin into adjacent organs or tissues by direct extension, or through regional lymph nodes, but appears to have spread no further.
>
> Distant – A malignant tumor that has spread to parts of the body remote from the organ of origin.

Rate – The number of events occurring in a specific population during a given period of time. Rates in this report are expressed per 100,000 male population.

Incidence rate – The number of new cancer cases of a specific site occurring in a specified population during a year, expressed as the number of cancers per 100,000 population. It should be noted that the numerator can include multiple cancer sites occurring in one individual and, except for in situ bladder cancer, excludes in situ cases. All incidence rates in this report are standardized to the 1970 U.S. population.

Mortality rate – The number of deaths with cancer given as the underlying cause of death occurring in a specific population during a year, expressed as the number of deaths due to cancer per 100,000 population. All mortality rates in this report are standardized to the 1970 U.S. population.

Age-adjusted rate – The incidence and mortality per 100,000 population expected for Wisconsin if the state's age distribution were the same as that of the standard population. For incidence and mortality rates in this report, the standard population used was the 1970 U.S. population. Age-adjusted rates allow comparisons between different population groups by controlling the effects of age differences between populations.

Mary Foote, WCRS Epidemiologist, prepared this paper as part of the Centers for Disease Control and Prevention's National Program of Cancer Registries.

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